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For: A TOUCH PANEL WITH AN INTEGRAL WIRING HARNESS

1 A method of manufacturing a touch screen panel, the method comprising:
2 coating an insulative substrate with a resistive layer;
3 depositing a dielectric border layer on the periphery of the resistive
4 layer; and
5 applying a pattern of conductive edge electrodes to the resistive
6 layer and applying a conductive wire trace pattern to the dielectric border layer to
7 electrically isolate the wire trace pattern from the edge electrodes.

1 2. The method of claim 1 in which the resistive layer is a tin oxide
2 composition.

1 3. The method of claim 1 in which the insulative substrate is glass.

1 4. The method of claim 1 in which the step of depositing the dielectric border
2 layer includes screen printing a lead borosilicate glass composition on the periphery of
3 the resistive layer.

1 5. The method of claim 1 in which the step of applying the pattern of
2 conductive edge electrodes to the resistive layer and the step of applying the conductive
3 wire trace pattern to the dielectric border layer includes screen printing silver/frit paste on
4 the resistive layer to form the edge electrode pattern and simultaneously screen printing a
5 silver/frit paste on the dielectric border layer to form the wire trace pattern.

1 6. The method of claim 1 further including the step of applying a protective
2 border layer over the edge electrodes and the wire traces.

1 7. The method of claim 6 in which the step of applying the protective border
2 layer includes screen printing an insulative composition over the edge electrodes and the
3 wire traces.

1 8. The method of claim 7 in which the insulative composition is a lead
2 borosilicate glass composition.

1 9. The method of claim 6 further including the step of firing the applied edge
2 electrodes, the wire traces, the dielectric border layer, and the protective border layer.

1 10. The method of claim 9 in which firing includes subjecting the panel to an
2 elevated temperature in a first period of time to burn off any organic material and a dwell
3 period at the elevated temperature to cure the electrodes and wire trace materials and to
4 fuse the border layer materials.

1 11. The method of claim 10 in which the elevated temperature is between
2 500°C-525°C, the first time period is approximately 5 minutes and the dwell period is
3 approximately 2-3 minutes.

1 12. A touch screen panel comprising:
2 a substrate with a resistive layer deposited on one surface thereof;
3 a dielectric border layer on the periphery of the resistive layer;
4 a conductive wire trace pattern on the dielectric border layer; and
5 a pattern of conductive edge electrodes on the resistive layer.

1 13. The touch screen panel of claim 12 in which the resistive layer is a tin
2 oxide composition.

1 14. The touch screen panel of claim 12 in which the substrate is glass.

1 15. The touch screen panel of claim 12 in which the dielectric border layer is
2 formed from a lead borosilicate glass composition.

1 16. The touch screen panel of claim 12 in which the conductive wire trace
2 pattern is formed from a silver/frit paste composition.

1 17. The touch screen panel of claim 12 in which the pattern of conductive
2 edge electrodes are formed from a silver/frit paste composition.

1 18. The touch screen panel of claim 12 further including a protective border
2 layer over the edge electrodes and the wire traces.

1 19. The touch screen panel of claim 18 in which the protective border layer is
2 formed from a lead borosilicate glass composition.

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1 20. A method of manufacturing a touch screen panel, the method comprising:

2 coating a substrate with a resistive layer;

3 applying a pattern of conductive edge electrodes to the resistive

4 layer;

5 depositing a dielectric border layer over the conductive edge

6 electrodes; and

7 applying a wire trace pattern on the dielectric border layer.

1 21. The method of claim 20 in which the resistive layer is a tin oxide
2 composition.

1 22. The method of claim 20 in which the substrate is glass.

1 23. The method of claim 20 in which the step of depositing the dielectric
2 border layer over the conductive edge electrodes includes screen printing a lead
3 borosilicate glass composition on the periphery of the touch screen panel over the
4 conductive edge electrodes.

1 24. The method of claim 20 in which the step of applying the pattern of
2 conductive edge electrodes includes screen printing silver/frit paste on the resistive layer
3 to form the edge electrode pattern.

1 25. The method of claim 20 in which the step of applying a wire trace pattern
2 includes screen printing silver/frit paste on the dielectric border layer to form the wire
3 trace pattern thereon.

1 26. The method of claim 20 further including the step applying a protective
2 border layer over the wire trace pattern and the dielectric border layer.

1 27. The method of claim 26 in which the step of applying the protective
2 border layer includes screen printing an insulative composition over the wire trace pattern
3 and the dielectric border layer.

1 28. The method of claim 27 in which the insulative composition is a lead
2 borosilicate glass composition.

1 29. The method of claim 27 further including the step of firing the applied
2 edge electrodes, the wire traces, the dielectric border layer, and the border layer.

1 30. The method of claim 20 in which firing includes subjecting the panel to an
2 elevated temperature in a first period of time to burn off any organic material and a dwell
3 period at the elevated temperature to cure the electrodes and wire trace materials and to
4 fuse the border layer materials.

1 31. The method of claim 30 in which the elevated temperature is between
2 500°C-525°C, the first time period is approximately 5 minutes and the dwell period is
3 approximately 2-3 minutes.

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1 32. A touch panel comprising:

2 a substrate with a resistive layer deposited on one surface thereof;

3 a pattern of conductive edge electrodes on the resistive layer;

4 a dielectric border layer over the pattern of conductive edge

5 electrodes; and

6 a wire trace pattern on the dielectric border layer.

1 33. The touch panel of claim 32 in which the resistive layer is a tin oxide

2 composition.

1 34. The touch screen panel of claim 32 in which the substrate is glass.

1 35. The touch screen panel of claim 32 in which the dielectric border layer is

2 formed from a lead borosilicate glass composition.

1 36. The touch screen panel of claim 32 in which the conductive wire trace

2 pattern is formed from a silver/frit paste composition.

1 37. The touch screen panel of claim 32 in which the pattern of conductive

2 edge electrodes are formed from a silver/frit composition.

1 38. The touch screen panel of claim 32 further including a protective border
2 layer over the edge electrodes and the wire traces.

1 39. The touch screen panel of claim 38 in which the protective border layer is
2 formed from a lead borosilicate glass composition.

1 40. A method of manufacturing a touch screen panel, the method comprising:

2 coating an insulative substrate with a resistive layer;

3 depositing a dielectric border layer on the periphery of the resistive

4 layer;

5 applying a pattern of conductive edge electrodes to the resistive

6 layer and applying a conductive wire trace pattern to the dielectric border layer to

7 electrically isolate the wire trace pattern from the electrodes;

8 depositing a protective border layer over the edge electrodes and

9 the wire traces to protect them; and

10 co-firing the wire trace pattern, the edge electrodes, the dielectric

11 border layer, and the protective layer all at the same time.

1 41. A method of manufacturing a touch screen panel, the method comprising:
2 coating a substrate with a resistive layer;
3 applying a pattern of conductive edge electrodes to the resistive layer;
4 depositing a dielectric border layer over the conductive edge electrodes;
5 applying a wire trace pattern on the dielectric border layer;
6 applying a protective border layer over the wire trace pattern; and
7 co-firing the wire trace pattern, the edge electrodes, the dielectric border
8 layer, and the protective border layer all at the same time.